

ABSTRACT

The present invention provides methods for determining the level of protein activity in a cell by: (i) measuring abundances of cellular constituents in a cell in which the activity of a specific protein is to be determined so that a diagnostic profile is thus obtained; (ii) measuring abundances of cellular constituents that occur in a cell in response to perturbations in the activity of said protein to obtain response profiles and interpolating said response profiles to generate response curves; and (iii) determining a protein activity level at which the response profile extracted from the response curves best fits the measured diagnostic profile, according to some objective measure. In alternative embodiments, the present invention also provides methods for identifying individuals having genetic mutations or polymorphisms that disrupt protein activity, and methods for identifying drug activity *in vivo* by determining the activity levels of proteins which interact with said drugs.